

1925: Pauli Exclusion Principle

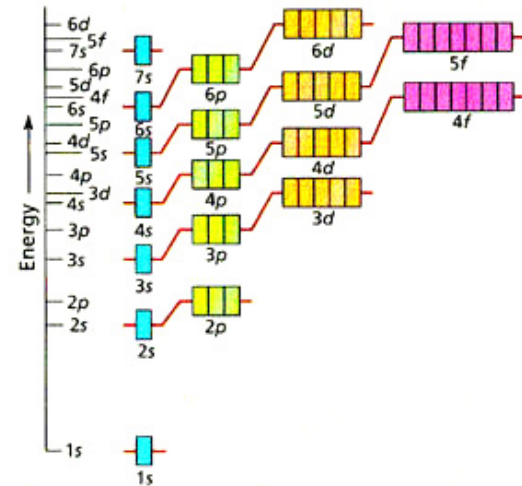


Wolfgang Pauli (1900-1958)

Evolution of the Theory: In the early 20th century it was discovered that atoms tended to be more stable when they contained an even number of electrons, more specifically 2, 8, and 18. After Edmund Stoner's paper in 1924 on principle quantum numbers Pauli realized that there must be a simple rule: only one electron per state.

Theory: The exclusion only affects particles with non-integer spins, electrons for example. There are four quantum numbers that govern the principle, which states that no two particles in an atom can share the same quantum numbers, i.e. be in the same state.

Implications: With the exclusion principle many physical phenomenon could be explained. For example, the complex nature of the electron shell and the way that atoms bond and share electrons. Through rigorous proofs it has also been shown that the principle can explain the stability of matter and the measureable volume of an atom.



A diagram of electron orbitals